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The
IMPACT
of

TECHNOLOGICAL CHANGE

ON MARKETING COSTS AND GROWER'S RETURNS

- Case Studies for
- POTATOES
 - SNAP BEANS
 - ORANGES
 - LEMONS

Marketing Research Report No. 573

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CONTENTS

	<u>Page</u>
Summary	iii
Introduction.	1
Impact of processing on marketing costs	2
The impact of processing on grower's returns	4
Marketing margins and grower's returns	5
Potatoes and potato products.	6
Snap beans -- fresh, canned, and frozen.	13
Oranges and orange products.	18
Lemons and lemon products	22
Conclusion	27

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SUMMARY

Case studies were conducted on four food products retailed in Washington, D. C., in 1959-60 to determine the impact of added processing on prices and marketing costs. The farm products selected for study were potatoes, snap beans, oranges, and lemons. Data were collected regarding the fresh product and at least two processed forms of the product. These data consisted of retail prices; retail, wholesale, packer, and processor gross margins; transportation charges; and returns to growers.

Fresh potatoes from Maine and New York retail in Washington, D. C., for lower prices than the processed products, frozen french fries and dehydrated mashed potatoes (fresh equivalent basis). Fresh potatoes from Idaho, however, cost consumers a little more than the dehydrated product. Total marketing margins were larger for the two processed products than for the fresh potatoes. The processor margin accounted for more than half of the total margin of the processed products. Grower's returns from the processed products marketed in Washington during the period of the case studies were lower than those for fresh potatoes.

The average retail price was lower for fresh snap beans than for equivalent quantities of frozen or canned snap beans. Chain store and packer's margins also were lower for fresh beans, than they were for processed beans. Transportation charges, however, were lower for the processed products. Compared with total marketing charges for fresh snap beans, those for canned snap beans were 76 percent higher and those for frozen beans were 97 percent higher. Grower's gross returns were considerably lower for beans to be processed than those for the fresh market. Production expenses, of course, may have been lower for beans sold to processors.

Prices consumers paid for canned orange juice and frozen orange concentrate were about the same as those for equivalent quantities of Florida fresh oranges but much lower than retail prices of California oranges during the period studied. Oranges used in the processed products were grown in Florida. Retail margins were smaller for the processed products than for the fresh oranges. Transportation charges, likewise, were lower for the processed products than for Florida fresh oranges and much lower than for California oranges. The packer's margin for Florida fresh oranges was less than processor margins. Total marketing margins for each of the processed products were less than those for the fresh oranges. Florida growers received more for oranges sold to processors than from those for fresh markets.

Consumers paid more for fresh lemons than for equivalent quantities of canned single-strength lemon juice or frozen lemonade concentrate. The chain store margins and transportation charges also were higher for fresh lemons than for the processed products. The margin for packing fresh lemons, however, was smaller than those for processing the lemon products. Total marketing charges were substantially higher for fresh lemons than for canned lemon juice but were about the same for fresh lemons and frozen lemonade concentrate.

Costs of processing for each of the four products studied were higher than costs of packing for fresh market sales. Part of the added cost of processing, however, was offset by economies at other stages in the marketing process. For each of the four commodities, the cost of shipping equivalent quantities was less for processed products than for fresh marketings, with a single exception--transportation cost more for frozen french fries shipped from Maine than for fresh potatoes shipped from New York State.

It may cost less to retail a processed product than a fresh product because handling (loading and unloading, stacking on shelf, etc.) requires less labor. Waste and spoilage is much less for the processed product. On the other hand, products with the highest prices tended to have the largest retail margins. Compared with margins for fresh products, those for processed potatoes and snap beans were higher and those for processed orange juice and lemon juice (canned and frozen concentrate) were lower. The margin for fresh Idaho potatoes, which was higher than that for dehydrated potatoes, was an exception to this generalization. Retail prices were higher for processed potatoes and beans, lower for processed lemon juice, and about the same for processed and fresh Florida oranges.

Total costs of marketing per unit were higher for processed potatoes and beans than for fresh potatoes and beans. Thus, the added cost of processing was not completely offset by savings on transportation and wholesaling and retailing. But for oranges and lemons, marketing costs were lower for the processed products. The added cost of processing was offset by lower charges for transportation and retailing.

For potatoes, beans, and lemons, the grower's return per unit of product was lower from products sold in processed form than in fresh form. However, the reverse was true of oranges for the period covered by the case studies. But we cannot infer from these data that growers who sold to processors had a lower net income than those who sold to fresh market dealers. Production for processing may be located in areas where yields are higher and production costs lower than in areas producing for fresh market. Because transportation costs are lower for processed products, production can be located in low cost areas though they are distant from population centers. Harvesting costs may be lower for fruits and vegetables to be processed than for those marketed fresh. Products having external defects and sizes and shapes unacceptable for fresh market may also be used for processing.

THE IMPACT OF TECHNOLOGICAL CHANGE ON MARKETING COSTS AND
GROWER'S RETURNS--CASE STUDIES FOR POTATOES,
SNAP BEANS, ORANGES, LEMONS

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INTRODUCTION

Food marketing in this country has been characterized by continual technological change. Dynamic technology is associated with changes in market organization and with the structure of marketing institutions, the services they perform, and the costs of the services. Many of the factors that affect the direction and amount of change are "internal" in nature, such as the development of new products, new processes for preserving quality, and improved methods for transporting, storing, and handling food products. Other changes are adjustments to "external" factors such as higher consumer income, changes in size and location of population, greater proportion of women working away from home, and developments in production technology on the farm that affect the supply of farm products.^{1/} This report deals primarily with the internal factors. These are the factors over which operators in the marketing system have some control and which more directly affect marketing costs and grower's returns.

This report explains some of the economic consequences of variation in processing and other marketing services under different marketing situations. It presents case studies comparing marketing margins and grower's returns for alternative forms of four food commodities that require varying degrees of processing. The products studied were potatoes, snap beans, oranges, and lemons sold in chain food stores in Washington, D. C.

The trend toward more highly processed foods is gaining in importance. The urban population is growing, resulting in increased demand for more commercially processed food.

Technological change has developed at all levels of the marketing system, not just at the processing level. Changes at one level have often created a chain reaction requiring changes at other levels in the system. For example, the advent of self-service stores hastened the need for new handling and packaging methods. Research and innovation in one area may open up inquiry or induce change in another area. The drive toward technological development in marketing is motivated by the possibility of profit through expanding sales or reducing costs.

Cost of Marketing Services

Charges for marketing services provided at all levels of the marketing system increased from \$9 billion in 1940 to about \$40 billion in 1960. During the same period consumer expenditures for farm food increased from \$14.5 billion to \$60 billion,

^{1/} For a discussion of the impact of some external factors on marketing refer to: Burk, M. C., Trends and Patterns in U. S. Food Consumption. U. S. Dept. Agr. Econ. Res. Serv., Agr. Handbook No. 214, June 1961.

while farm receipts increased from \$5.5 billion to \$20 billion. However, between 1947-49 and in 1960 the marketing bill almost doubled while farm receipts changed very little. 2/

Added volume of products handled accounted for \$8.5 billion of the \$31 billion rise in the marketing bill since 1940. The rise in cost levels accounted for another \$15 billion. The remaining \$7.5 billion represented payments made by consumers for the increase in marketing services. Thus, only about one-fourth of the rise in marketing cost during the last 20 years can be attributed to increased marketing services per unit of product.

Services per unit of food marketed increased about 30 percent from 1940 to 1960. Increased services include more meals eaten away from home, more transportation, refrigeration, packaging, and processing.

Though the total volume of food marketing services has nearly doubled since 1940, some types of service have been reduced. Milk deliveries to homes have been reduced from 7 to 3 or less per week. Self-service and cash and carry supermarkets have been substituted for clerk-service and credit-and-delivery grocery stores.

. Many marketing services do not add to the cost of food to the consumer because of offsetting economies. For example, in some instances, the extra cost of processing and packaging is offset by reductions in waste and spoilage and lower cost of shipping and handling.

Consumer Demand for Marketing Services

The demand for marketing services is tied in closely with the demand for food. Consumers may substitute one commodity for another according to their individual economic circumstances and according to the price and quality of the products available to them. Consumers may also substitute highly serviced foods for lesser serviced foods.

The price of most marketing services is not usually quoted separately from prices for food. However, consumers can control to some extent the amount of additional services purchased if they have a choice between forms of food.

IMPACT OF PROCESSING ON MARKETING COSTS

Increased consumption of more highly processed food products could not have been possible without many technological innovations in food processing. The impact of these innovations on the cost of marketing varies considerably both by type of innovation and by type of product.

The two types of innovations that characterize most of the technological change in marketing are product innovations which deal with the development of a new form of product, and operational innovations which allow for the substitution of capital for labor.

2/ Agricultural Marketing Service. Food Costs. Misc. Pub. No. 856, U. S. Dept. Agr., Apr. 1961.

Product Innovations

Product innovations are defined as those having to do with the development of a new food product by a new processing technique that adds either market or consumer-oriented services. Market-oriented services are those added by processing to preserve the product, maintain quality, and reduce bulk in handling and transportation. Consumer-oriented services provide functions formerly performed by the consumer or the retailer. These services often reduce preparation time for the consumer and offer ease of storage. Convenience foods are an example of consumer-oriented services. In many cases it is difficult to separate market-oriented services from those performed for consumer convenience because they both have similar results.

The principal contribution of innovations in market oriented services has been to make commodities available to consumers on a year-round basis, to maintain quality at a high level, and to provide consumers with many new food products. Developments in canning, freezing, and dehydration are examples of innovations that are market oriented. Innovations of this type often increase costs because of additional marketing operations performed.

Though processing would increase costs if other conditions remained unchanged, it may change other conditions so that total unit marketing costs decrease. Marketing firms would hardly incur the costs of processing unless they expected to strengthen the demand for their products. Demand might be increased by making products available throughout the year, by extending their marketing area, or by increasing their attractiveness to consumers. Demand might expand to the extent that additional economies of scale could be achieved in processing the product. The final result might be that the cost of processing would be little higher than the cost of marketing the product in an unprocessed form.

Moreover, additional costs incurred through processing may be offset by savings at other points in the marketing channel. Often it costs less to wholesale and retail a product that processing has made more standardized and less perishable. Savings are usually made in transportation and storage costs of processed foods because of reduction in weight and volume. If processing increases a product's consumer appeal and its turnover in retail stores, retailers tend to take a smaller margin.

The extent to which processing can result in lower costs depends on the balance between offsetting economies and costs--economies due to increased production and distribution and additional marketing costs associated with processing the product. Often processors are able to utilize raw products of lower grade (external defects color, size, etc.), which would not be suitable for the fresh market. The lower prices they pay, compared with prices paid for products marketed fresh, help offset the effect of extra processing costs on retail prices.

Consumer-Oriented Services

Processing services which prepare the product for the market usually add convenience for the consumer in addition to preserving the commodity.

Many of the processed products require less preparation by the housewife. These services represent an additional marketing operation which substitutes factory labor for the housewife's labor. For some products this goes beyond the minimum requirements for preservation and often results in increased marketing costs. This does not

mean that convenience services cannot be performed efficiently. Many cost-cutting economies may be applied in the process of incorporating the convenience service in the product.

As for product-oriented services, the ultimate impact of convenience services on marketing cost depends partly on the demand created for the final product and the possibility that savings may develop at other levels of the marketing system.

Operational Innovations

Operational innovations as distinguished from product innovations do not change the characteristics of the product. They are improvements in the marketing system that facilitate movement of a product from farm to consumer. Most of these innovations are mechanical or chemical in nature; others are the result of realignments in market organization and better managerial practices. Operational innovations include engineering and design developments such as improved layout of processing plants or rearrangement of food stores to facilitate self-service. They include the adoption of techniques to cut marketing cost for a particular task, which may range from the adoption of continuous process in manufacturing to electronic inventory control at the wholesale level. Most operational innovations are geared to reducing the cost of performing a particular marketing task.

Operational innovations are often concurrent with the development of new or improved products. As a result of the new product, improved handling techniques may be adopted that may create a chain reaction of changes and improvements at other levels of the marketing system. Isolation of the separate effects of operational innovation on costs is usually not possible.

THE IMPACT OF PROCESSING ON GROWER'S RETURNS

The impact on farmers of the cost of additional marketing services varies according to: Supply of the raw product, demand for the finished product, locations of producing areas, and the bargaining power of the producers. When increases in marketing services raise marketing costs, the share of the consumer's dollar going to producers becomes lower, but the return per production unit (per acre or animal unit) is not necessarily lower. Depending upon production and marketing conditions, farmer's returns can be the same or higher.

Supply

In considering the effect of added marketing service on the grower's returns, two conditions of supply at the grower's level must be taken into account. One of these is a relatively fixed supply in the short run due to slow entry into production and slow exit from production or a long production period. The other condition is a flexible supply that can vary greatly from year to year because of relatively easy entry and exit, and usually a short production period.

When the total supply of a commodity is relatively fixed in the shortrun, increased marketing services can mean greater returns for growers, if the introduction of additional services increases total demand. If the demand for the product does not increase sufficiently, added marketing cost will lower the farmer's returns.

With flexible supply, production may be increased so quickly that farmers enjoy for a relatively short period price increases resulting from expanded demand. Supply may be reduced quickly, however, if demand decreases.

Shifts in Production Areas

Increased processing of farm products has caused shifts in production from one area of the country to another. Most of these changes have been toward the more efficient, specialized areas of production. Processors tend to locate their plants in production areas with the greatest comparative advantage.

In many commercial areas growers produce only for the processing market; in other areas only for the fresh market. Returns for these fresh and processed products may have little or no relation to one another in the short run. However, some producers have the alternative of producing for both outlets. By varying the flow of product to alternative outlets growers are able to improve their total returns.

Grower's returns and production patterns may be affected by changes in demand for fresh and processed products. For example, the production of fresh market peas has almost been replaced by production of peas for processing, causing a shift in production areas. Grower's returns in the new area will depend upon their bargaining power, the supply situation, and production costs. The effect on growers in the area from which the shift was made will depend upon alternative enterprises available to them.

Bargaining Power

In the shift from fresh to processed forms, some forces operate to weaken the farmer's bargaining position, and others strengthen it. A farmer's bargaining position could be weakened by fewer firms controlling purchases of farm foods for processing. Census figures show that the number of plants processing farm foods declined about 10 percent between 1947 and 1958.^{3/} The number of firms in food manufacturing has also declined. Mergers and acquisitions have been common.

Since production for processing is shifting to concentrated commercial areas, fewer farmers with increased operations will produce more for sale to food processors. These farmers may be better able to organize effective cooperative bargaining and marketing organizations and to obtain a higher return from their operations, notwithstanding the effect of fewer food manufacturing firms.

MARKETING MARGINS AND GROWER'S RETURNS

Case studies of four commodities -- potatoes, snap beans, oranges, and lemons -- show marketing margins and components for fresh and for two processed forms of each product. These data demonstrate the effect of technological innovations on marketing margins and grower's returns for a set period of time.

^{3/} Scott, F. E. and Hiemstra, S. J. The Food Marketing Industries--Recent Changes and Prospects. Mktg. and Transportation Situation, MTS-144, U. S. Dept. Agr., Feb. 1962.

Method of Study

Retail prices were collected from four supermarkets in the metropolitan area of Washington, D. C., during the first full week of each month from July 1959 through June 1960. Each store was a member of a different food chain organization, whose total sales represent a large portion of total food sales in the metropolitan area. Each chain used a central pricing policy for all its stores in the area.

The object was to price each of the major forms of the commodities selected and to include at least three forms available throughout the year. Brand, variety, size, and grade, was identified for each product priced in each store.

The chainstore margin is the difference between the retail price and the price delivered at the chain-warehouse. Each product priced at retail was traced through records at the central office of the chain to obtain the price of the product delivered to the warehouse. Since it was impossible to price identical lots sold at retail, we priced the most recent purchase of the product before the date that retail prices were collected. Information was also obtained as to when and from whom the lot was purchased by the chain. Freight charges were also recorded. An allowance was made for waste and spoilage at retail for fresh products. For example, for each 100 pounds of fresh potatoes bought, 98 pounds were considered sold and 2 pounds as waste and spoilage. The retail price is based on the sale of 98 pounds.

Selected lots were traced from the chain warehouse back through other steps in the marketing system. Information on charges, selling prices, transportation charges, packer or processor margins, conversion factors, and grower's returns was obtained by a mailed questionnaire from each handler in the market system. Information was obtained for shipments that corresponded to the specifications. Fresh products were traced back through the marketing system each month and processed products every other month. Prices of the fresh items are more variable than prices of the processed items.

The marketing margins in this study are based on averages of case studies made throughout the year. These data are presented for the 12-month period and components combined when necessary to prevent disclosure.

The chain margin is a simple average of the spread between the buying and selling price for each product studied in the four chains by months. Data for other levels of the marketing system are presented as simple averages of the lots of each product that were traced back to other handlers.

The margins for each form of a commodity are presented on a comparable basis. Margins for all processed products except orange products are for the quantity of processed products obtained from a specific quantity of the raw product at the grower's level -- 100 pounds potatoes, 28 pound basket of snap beans, or 39.5 pound carton of lemons. Margins for orange products are based on the quantity of oranges required to provide 24 ounces of single-strength orange juice to the consumer.

Potatoes and Potato Products

The trend toward utilizing potatoes in processed form has accelerated in recent years. In 1956, 14 percent of the potatoes used for food were processed. By 1960 processing accounted for one-fourth, when almost 5 billion pounds of potatoes went

into processed food products.⁴ The 5 billion pound figure does not include potatoes processed into flour or starch.

Retail prices, components of marketing margins, and grower's returns were obtained for fresh late-crop potatoes from Idaho, Maine, and New York, frozen french-fried potatoes from Maine, and dehydrated mashed potatoes from Maine and Idaho (fig. 1). These States were the principal supply areas for the stores included in the study. Other areas supplied potatoes during the study, but not over a long enough period to provide sufficient observations to report. This applied particularly to new crop potatoes for which production shifts from area to area as the season progresses.

Retail Price

The retail price was highest for frozen french-fried potatoes. It averaged \$12.94 (table 1) for the product derived from 100 pounds of potatoes. The average price was \$3.62 less for an equivalent quantity of dehydrated mashed potatoes. The difference in price reflects in part cost of freezing, supplemental ingredients, handling and, in part, price reductions through special promotions offered by manufacturers of the relatively new dehydrated product.

⁴/ Crop Reporting Board. Irish Potatoes; Utilization of 1960 Crop with Comparisons. U. S. Dept. Agr., Statis. Res. Serv. (Pot. 1-3) Sept. 14, 1961.

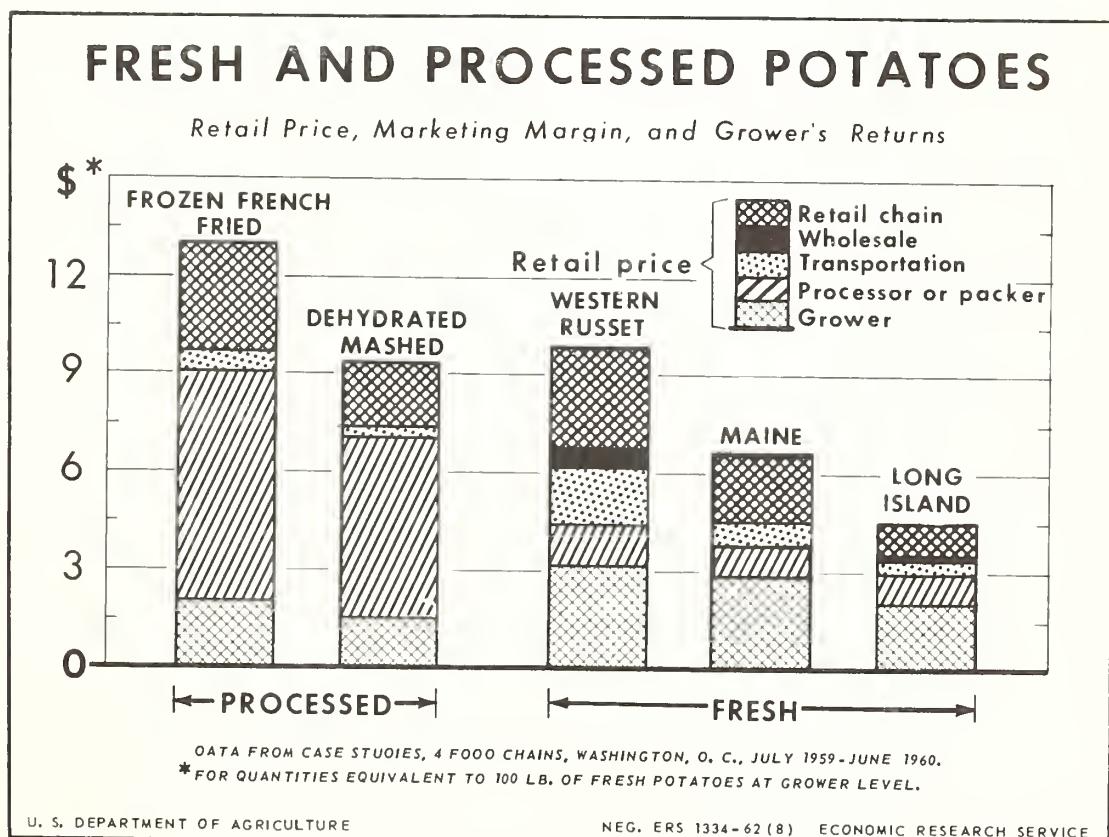


Figure 1

Table 1.--Potatoes: Retail price, marketing margin, and grower's return for selected lots of fresh potatoes, frozen french fries, and dehydrated mashed in quantities equivalent to 100 pounds, four chain stores, Washington, D. C., July 1959 - June 1960 ^{1/}

Item	Fresh			Frozen french			Dehydrated		
	Idaho	Maine	New York	fries	fries	fries	mashed	mashed	mashed
Retail price ^{3/}	Dol. ^{9.82}	Pct. ^{2%}	Dol. ^{6.52}	Pct. ^{2%}	Dol. ^{4.51}	Pct. ^{2%}	Dol. ^{12.94}	Pct. ^{2%}	Dol. ^{9.32}
Marketing margin--	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Chain margin.....	3.05	31.1	2.00	30.7	1.06	23.5	3.25	25.1	2.04
Intermediate margin.....	.56	5.7	.02	.3	.09	2.0	---	---	---
Transportation.....	1.86	18.9	.87	13.3	.48	10.6	.66	5.1	.22
Processor or packer margin ^{4/}	1.16	11.8	.86	13.2	.82	18.2	7.01	54.2	5.58
Total.....	6.63	67.5	3.75	57.5	2.45	54.3	10.92	84.4	7.84
Grower's return.....	3.19	32.5	2.77	42.5	2.06	45.7	2.02	15.6	1.48

^{1/} Averages of case study data.

^{2/} Percentage of retail selling price.

^{3/} Fresh potatoes only--2 percent allowance for waste and spoilage at retail level.

^{4/} Packer's margin for fresh potatoes estimated for 19 out of 32 lots of fresh potatoes traced to the packer; estimates based on data from Marketing Margins for Fall Potatoes, U. S. Dept. Agr. Mktg. Res. Rpt. 450, Feb. 1961.

The retail price for fresh potatoes from Idaho averaged \$9.82 for the period studied -- 50 cents higher than the price for an equivalent quantity of the dehydrated product. Prices for fresh potatoes from Maine and New York averaged considerably less, \$6.52 and \$4.51 respectively.

Retail prices were more stable during the year of the study for processed potato products than for fresh potatoes (tables 2 and 3). The average variation in monthly prices was much less for dehydrated mashed potatoes than for fresh, but it was only slightly less for frozen french fries than for fresh Idaho potatoes. The price of Maine potatoes varied most, fluctuating as much as \$2.07 from one month to another.

Chain Store Margin

The chain store margin as a percentage of retail price averaged 24 percent for processed potato products and 29 percent for fresh potatoes from Idaho, Maine, and New York. However, the chain margin averaged \$2.65 for the processed products compared with \$2.04 for the fresh potatoes.

The average month-to-month variation in retail margins was slightly greater for fresh potatoes than for processed products (tables 2 and 3).

Deal Prices and Margins for Dehydrated Potatoes

Chain store buying prices tended to vary according to the type of deal offered by the processor. Almost half of the lots of dehydrated potatoes traced through the chains were bought through some type of special deal. Each processor set a list price for this product, but in many cases this appeared to be the point to start bargaining.

Processors offered several kinds of deals during this study. The most common one was the "5 cents off regular price" deal, by which the processors sponsored a reduction in price to the consumer. The retailer buys the product at 5 cents less per package than list price. This produces the same dollar margin per package but a higher margin as a percentage of retail price. In another type of deal the retailer buys 5 cases and gets one free -- 6 cases for the price of 5, or maybe 10 cases for the price of 9, etc. Retailers had the options of passing this reduction on to the consumer. Many of these deals are tied in with advertising or promotional activity. A few processors offered discounts to retailers in addition to an advertising allowance.

These observations make it clear that when computing retail margins it is important to take into consideration the deal prices. This has been done in this report, and it explains part of the month-to-month variations in retail prices and margins shown for the processed products.

Intermediate Handlers Margin

The four chains in the study used intermediate handlers (wholesalers) more when buying Idaho potatoes than when buying Maine or New York potatoes. The chains generally bought truck or carload lots of Maine and New York potatoes directly from shippers. However, many times they purchased less than carload lots of Idaho potatoes from receivers on the local wholesale market. For these reasons, we show an intermediate handler's margin of 5.7 percent for Idaho potatoes and a relatively insignificant margin for Maine and New York potatoes (table 1).

Table 2.--Potatoes: Retail price and margin for selected lots of frozen french-fried and dehydrated mashed potatoes in quantities equivalent to 100 pounds fresh potatoes, four chain stores, Washington, D. C., by months, July 1959 - June 1960 1/

Month and year	Frozen french fries			Dehydrated mashed		
	Retail margin		Retail	Retail margin		Retail
	Retail	Percentage	price	Retail	Percentage	price
	Actual	of retail	price	Actual	of retail	price
<u>1959</u>	<u>Dol.</u>	<u>Dol.</u>	<u>Pct.</u>	<u>Dol.</u>	<u>Dol.</u>	<u>Pct.</u>
July.....	12.04	2.11	17.5	9.48	1.57	16.6
August.....	12.64	2.95	23.3	9.17	2.21	24.1
September.....	13.36	4.15	31.1	8.92	1.59	17.8
October.....	12.82	3.13	24.4	9.02	2.34	25.9
November.....	12.76	3.25	25.5	9.02	1.62	18.0
December.....	12.88	2.83	22.0	9.02	2.29	25.4
	:					
<u>1960</u>	<u>Dol.</u>	<u>Dol.</u>	<u>Pct.</u>	<u>Dol.</u>	<u>Dol.</u>	<u>Pct.</u>
January.....	13.36	3.37	25.2	9.20	2.14	23.3
February.....	12.64	3.25	25.7	9.36	1.87	20.0
March.....	12.64	3.25	25.7	9.55	2.18	22.8
April.....	13.73	3.73	27.2	9.55	2.68	28.1
May.....	13.36	3.73	27.9	9.67	2.26	23.4
June.....	13.12	3.13	23.9	9.92	2.65	26.7
	:					
12-month average..	12.94	3.25	25.1	9.32	2.04	21.9
	:					

1/ Averages of case study data.

Processed products were purchased directly from the manufacturer, either through the manufacturer's representative or through a broker. No intermediate margin is shown for the processed products. Manufacturer's representative and brokerage charges are paid by the manufacturer, and the charge is included in their margin.

Transportation

It cost less to transport potatoes as dehydrated mashed potatoes than in any other form included in this study. It cost 22 cents to transport from Idaho the quantity of dehydrated product equivalent to 100 pounds of the fresh product, and three times that amount (66 cents) for frozen french fries from Maine (table 1). Fresh potatoes from Idaho were delivered in Washington for \$1.86 per 100 pounds, compared with 87 cents for Maine potatoes, and 48 cents for potatoes from New York.

The processed products were delivered to chain warehouses in the Washington area for a transportation charge averaging from 2 to 5 percent of the retail price. The charge for transporting fresh potatoes from various shipping points average from 10 to 19 percent of the retail price, depending on the distance from source of supply and on the level of the retail selling price.

Table 3.--Potatoes: Retail price and margin for selected lots of fresh Idaho, Maine, New York, and other potatoes, four chain stores, Washington, D. C., by months, July 1959-June 1960 ^{1/}

Month and year	Idaho			Maine			New York			Other		
	Retail margin			Retail margin			Retail margin			Retail margin		
	Retail price	Actual; Percent age 2/	Actual; Percent age 2/	Retail price	Actual; Percent age 2/	Actual; Percent age 2/	Retail price	Actual; Percent age 2/	Actual; Percent age 2/	Retail price	Actual; Percent age 2/	Retail price
1959												
July.....	3/	---	3/	---	---	---	3/	---	---	9.48	3.74	39.5
August.....	3/	---	3/	---	---	---	3/	---	---	11.30	4.53	40.1
September....	10.04	4.52	45.0	3.40	35.4	3.40	3/	3.72	4.88	1.61	33.0	---
October.....	9.60	3.40	35.4	2.69	29.5	2.69	3/	4.14	2/	2/	2/	---
November....	9.13	3.22	35.9	5.61	1.97	35.1	5/	4.40	32.5	3/	3/	---
December....	8.98											---
Average.....	9.82	3.05	31.1	6.52	2.00	30.7	4.51	1.06	23.5	8.90	3.13	35.2
1960												
January.....	8.98	2.30	25.6	6.53	2.31	35.3	4.70	1.04	22.1	3/	3/	---
February....	9.21	2.35	25.5	6.02	1.92	31.9	4.33	.76	17.6	3/	3/	---
March.....	9.64	2.44	25.3	4.94	1.06	21.5	5.73	1.51	26.4	2/	2/	---
April.....	11.09	3.21	28.9	7.07	2.24	31.7	3/	---	8.23	2.06	25.0	---
May.....	11.70	3.32	28.4	7.53	2.07	27.5	3/	---	9.96	2.85	28.6	---
June.....	3/	---	7.96	2.42	30.4	3/	---	---	9.54	3.99	41.8	---
Average.....	9.82	3.05	31.1	6.52	2.00	30.7	4.51	1.06	23.5	8.90	3.13	35.2

^{1/} Averages of case study data. Retail price and margin adjusted for waste and spoilage--100 pounds bought, 98 sold, and 2 pounds waste and spoilage.

^{2/} Percentage of retail price.

^{3/} Not available or insufficient data to report.

Packer or Processor Margin

More than half of the consumer's dollar for processed potato products went to the processor. The processor's margin was \$7.01 for a quantity equivalent to 100 pounds fresh potatoes and \$5.58 for a similar quantity of dehydrated mashed potatoes. The processor's margin represents the difference between the cost of the raw potatoes and the f.o.b. price of the finished product. In addition to the cost of processing, it includes the cost of procurement, packaging, selling, promotion, storing, overhead, and profit.

The packer's margin for fresh potatoes was much less -- averaging from 82 cents to \$1.16 per hundredweight.

Marketing Margins

Total marketing margins were higher for processed potato products than for potatoes sold in fresh form. The margin for marketing frozen french fries averaged \$10.92 for a quantity equivalent to 100 pounds of fresh potatoes, and \$7.84 for dehydrated mashed potatoes. This amounted to 84 percent of the retail price for both products. The marketing margin for fresh potatoes ranged from \$6.63 for Idaho potatoes to \$2.45 for potatoes from New York. The margin as a percentage of retail price ranged from 67 to 54 percent.

The margin taken by the processor was by far the largest component of the total marketing margin for the processed products. It averaged 54 percent of the retail price for frozen french fries and 60 percent for dehydrated mashed potatoes. This compares to a packer's margin of 12 to 18 percent for fresh potatoes. The retail margin was the largest component for potatoes sold in fresh form.

A comparison of components of marketing margins for fresh and processed potatoes shows there are offsetting features that accompany the relatively high processor's margin (table 1). These features include lower transportation charges because of reduced weight and bulk, the elimination of the intermediate handler's margin through direct purchases, and the lower chain margins on the more standardized processed products. However, the offsetting savings were not sufficient to prevent higher marketing charges for the processed items.

Grower's Return

The grower's gross return in dollars and cents and as a percentage of the retail price was higher for potatoes sold on the fresh market from the three areas studied than for those going into processed products. The return for fresh potatoes ranged from 32 to 46 percent of the consumer's dollar compared with about 16 percent for both processed products (table 1).

For the case studies traced to the grower level, the grower's return for fresh-market potatoes averaged as much as \$3.19 per 100 pounds for those from Idaho and as low as \$2.06 for New York potatoes. The return for potatoes going into processed

products average \$2.02 per 100 pounds for those going into frozen french fries (from Maine) and \$1.48 for dehydrated mashed potatoes (from Maine and Idaho) (table 1). 5/

The grower's share was smaller for potatoes marketed in processed form than for those marketed fresh because farm prices were lower and marketing charges were higher. Processors pay less for potatoes as they are able to utilize potatoes of a lower grade than those suitable for the fresh market. They often buy sound potatoes of an odd shape or with external defects, neither of which affects the quality of processed products.

Potatoes marketed in processed products and those sold fresh were not necessarily grown during the same periods in time. This study showed that dehydrated potatoes were not stored for an appreciable period of time, while frozen french fries were stored as much as 7 months, averaging about 4 months. Table 4 shows the wide monthly variation in average farm prices for potatoes. Therefore, part of the difference in grower's returns from potatoes sold processed and fresh may be caused by a time lag for the cases studied.

Differences in farm prices by States may also account for differences in grower's returns between the two processed products (table 4). All lots of frozen french fries were traced to Maine, while about half of the lots of dehydrated mashed potatoes were from Maine and half from Idaho. Average farm prices varied widely each month between potatoes from Idaho and Maine.

Snap Beans--Fresh, Canned, and Frozen

The production of snap beans for processing accounted for less than one-third of the total production in 1940. The share going into processing gradually increased until by 1960 almost two-thirds of the total production was processed.

Snap beans for processing are grown in about three-fourths of the States in this country. Oregon, New York, Wisconsin, and California are the largest producing States, accounting for 39 percent of the total production for processing in 1940-49. By 1960 they produced 55 percent of snap beans for processing, an increase of 188 percent from 1940-49. Increased production in these States indicates a shift in production to more specialized commercial areas.

To demonstrate the variations in retail prices, marketing margins, and grower's returns, data are presented for fresh, frozen, and canned snap beans (fig. 2). Data for each form of processed product are for the quantity equivalent to 1 bushel (28 pounds) of fresh beans. In other words, prices and margins are for the quantity of processed product obtained from 1 bushel of fresh beans.

Retail Margins

The retail margin was less for snap beans sold in fresh form than for equivalent quantities sold canned and frozen. The margin averaged \$1.82 per bushel for fresh

5/ These are computed grower's returns based on case studies and therefore vary from actual prices paid farmers. In some areas potatoes are bought on a "field run" basis, that is, the farmer receives a price for his potatoes just as they come from the field. The processor or handler grades the potatoes and sells the top grade on the fresh market and diverts the remainder to processing. The price the farmer receives falls between the prices shown for fresh and processed potatoes.

Table 4.--Average farm prices per hundredweight for Maine and Idaho potatoes, by months, 1958-60

Months	Maine			Idaho		
	1958	1959	1960	1958	1959	1960
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
January.....	1.70	.85	1.95	1.30	1.05	2.50
February.....	2.25	.90	2.00	1.70	1.00	2.45
March.....	3.30	1.00	2.60	2.65	.90	2.90
April.....	3.00	.95	3.05	2.10	.95	3.00
May.....	1.85	2.05	3.30	1.20	1.50	2.60
June.....	1.25	3.25	2.15	.80	1.40	2.25
July.....	---	---	---	---	1.25	1.95
August.....	---	---	---	.80	.95	2.35
September.....	1.20	1.60	1.35	.92	1.12	1.70
October.....	.85	1.40	1.45	.95	1.25	1.55
November.....	1.00	1.45	1.50	1.00	1.65	2.05
December.....	.90	1.55	1.45	.90	1.80	1.95
Average.....	1.83	1.66	2.08	1.30	1.24	2.27

Source: Agricultural Prices, U. S. Dept. Agr., Statist. Rpt. Serv., Jan. 1959, 1960, 1961.

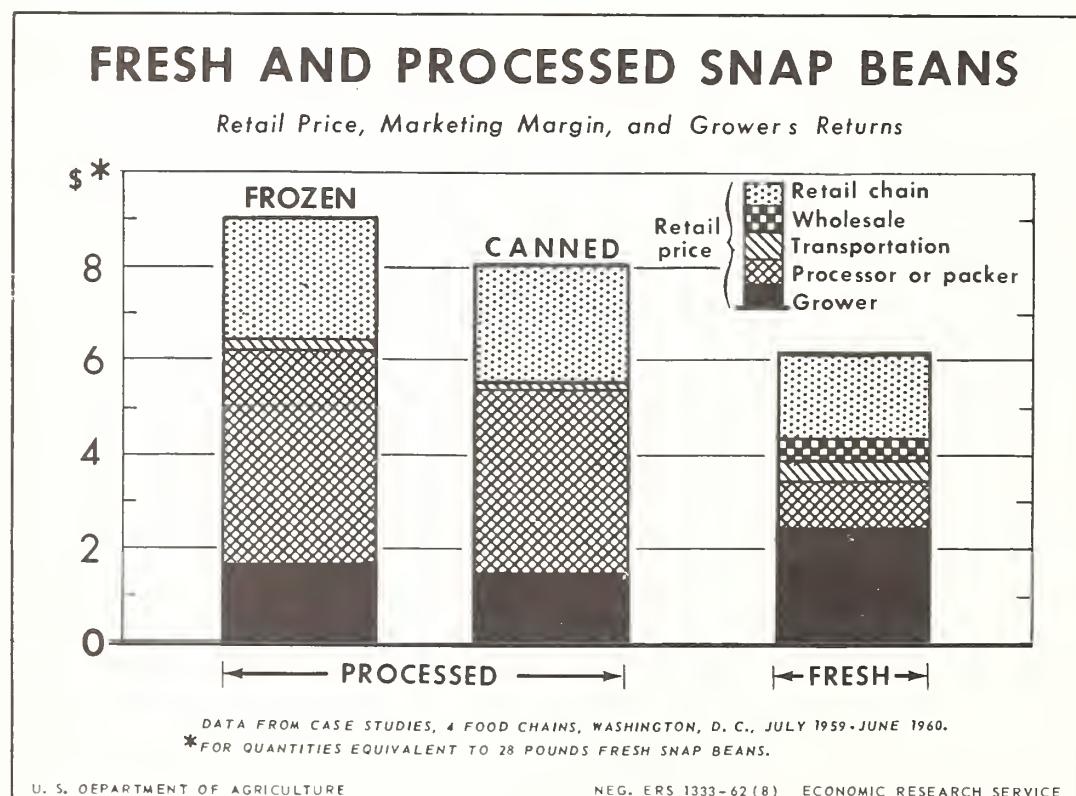


Figure 2

snap beans compared with \$2.52 for an equivalent quantity of canned beans and \$2.63 for those sold in frozen form (table 5). 6/ Although the actual margin was lowest for fresh snap beans, percentage margins averaged about the same for the three forms.

Retail prices and margins tended to be much more stable for the canned and frozen products than for fresh beans (table 6). The dollar margin for fresh snap beans was lowest during most of the 12 months. However, the margin as a percentage of retail selling price for canned snap beans was higher than for fresh beans in 8 of the 12 months.

Wholesale Margin

The larger chain organizations buy directly from shippers without going through the local wholesaler. Local chains and other smaller buyers find it advantageous to purchase their supplies daily on the local wholesale market or from truckers that deliver snap beans directly from the producing area to the chain warehouse. Out of 11 lots of fresh snap beans traced from the chain organizations back through the marketing system, 6 were traced through intermediate handlers. The wholesale margin for the 6 lots averaged 92 cents per bushel, while for all 11 lots the average wholesale margin was 50 cents or 8.1 percent of the average retail price.

6/ Retail margin adjusted for 2 pounds waste and spoilage--26 pounds sold at retail.

Table 5.--Snap beans: Retail price, marketing margins, and grower's returns for selected lots of fresh, frozen, and canned quantities equivalent to 28 pounds of fresh snap beans, four chain stores, Washington, D. C., July 1959 - June 1960 1/

Item	Fresh		Frozen		Canned	
	Dol.	Pct.	Dol.	Pct.	Dol.	Pct.
Retail price.....	<u>2/</u> 6.18	100.0	9.08	100.0	8.05	100.0
Marketing margin --						
Chain margin.....	<u>2/</u> 1.82	29.4	2.63	29.0	2.52	31.3
Intermediate margin....	.50	8.1	---	---	---	---
Transportation.....	.44	7.1	.22	2.4	.14	1.7
Processor or packer margins.....	<u>3/</u> 1.00	16.2	4.54	50.0	3.95	49.1
Total.....	3.76	60.8	7.39	81.4	6.61	82.1
Grower's return.....	2.42	39.2	1.69	18.6	1.44	17.9

1/ Based on case studies.

2/ Retail price and margin adjusted for 2 lbs. waste and spoilage -- 26 lbs. sold at retail.

3/ Estimated--includes 30 cents for packing and grading, 20 cents for shipper's margin, and 50 cents for shipping container.

Table 6.-Snap beans: Retail price and chain margin for fresh, frozen, and canned quantities equivalent to 28 pounds of fresh snap beans sold in four chain stores in Washington, D. C., by months, July 1959 - June 1960

Month	Fresh $\frac{1}{4}$ /			Frozen			Canned		
	Retail price	Retail margin	Percentage	Retail price	Retail margin	Percentage	Retail price	Retail margin	Percentage
	Actual : price	of retail price	:	Actual : price	of retail price	:	Actual : price	of retail price	:
	<u>Dol.</u>	<u>Dol.</u>	<u>Pct.</u>	<u>Dol.</u>	<u>Dol.</u>	<u>Pct.</u>	<u>Dol.</u>	<u>Dol.</u>	<u>Pct.</u>
1959									
July.....	4.68	1.92	41	9.22	2.80	30	8.53	2.78	33
August....	4.07	1.28	31	8.94	2.59	29	8.90	3.11	35
September....	4.37	1.39	32	9.06	2.82	31	9.52	3.57	38
October....	5.37	2.02	38	9.32	2.94	32	8.30	2.64	32
November....	6.06	1.64	27	9.12	2.92	32	8.53	2.46	29
December....	7.54	1.54	20	9.32	2.90	31	8.53	2.19	26
1960									
January....	6.68	1.88	28	9.17	2.44	27	8.28	2.46	30
February....	9.10	2.72	30	8.81	2.48	28	7.83	2.29	29
March....	7.80	2.04	26	8.81	2.42	28	7.42	1.95	26
April....	6.54	1.99	30	9.06	2.59	29	6.77	2.29	34
May....	6.89	2.11	31	9.42	2.65	28	6.94	2.39	34
June....	4.94	1.25	25	8.81	2.15	24	7.14	2.18	31
12-month average...	6.18	1.82	29	9.08	2.63	29	8.05	2.52	31

$\frac{1}{4}$ / Price and margin adjusted for 2 lb. waste and spoilage -- 26 lb. sold at retail.

A separate wholesale margin was not shown for the canned and frozen products. Most chains bought these products directly from processors through a broker. The processors paid the broker about 3 percent of the price f.o.b. the processor's plant. Some large chains maintained their own buying organizations and did not buy through a food broker. Other chains bought some of their supplies through frozen food distributors or wholesalers.

Transportation

The form in which snap beans are marketed affects the cost of transportation. It costs more to transport fresh snap beans than equivalent quantities of either of the processed products--frozen or canned. It cost an average of 44 cents per bushel hamper to transport fresh snap beans from producing areas to the warehouses of chain stores included in this study, contrasted to half that much for an equivalent quantity of frozen snap beans (22 cents). It cost 14 cents to transport an equivalent quantity of canned snap beans from the canner to the chain warehouse.

Processor or Packer Margin

The processor's margin averaged about 50 percent of the retail price for both frozen and canned snap beans. Based on case studies traced back to the processor, the freezer's margin averaged \$4.54 for a quantity of beans equivalent to 1 bushel of fresh beans at the grower level; for the canner it was \$3.95. These margins represent the difference between the cost of the raw product and the price received for the finished product f.o.b. the processor's plant. In the longrun the margin is expected to cover processing, storing, selling, advertising, overhead, and profit.

The packer's margin for fresh snap beans was not obtained for the lots used in these case studies. The packer's return for these lots, f.o.b. packing house, averaged \$3.42 per bushel. We can only estimate roughly the charges that made up this price. The following charges per bushel may be levied against the f.o.b. price: Packing and grading 30 cents; cost of bushel hamper, 50 cents; and other costs and profits, 20 cents. This leaves an estimated \$2.42 per bushel for the grower to cover cost of production and other expenses. The cost of harvesting is estimated to be about 95 cents a bushel.

Marketing Margins

The total marketing margins for processed snap beans averaged about 82 percent of the consumer's dollar while the margin for snap beans sold fresh averaged about 61 percent, excluding the charge for harvesting. Based on the average for all case studies, the total charge for marketing a bushel of snap beans in fresh form was \$3.76, in canned form \$6.61, and in frozen form \$7.39. The processor's margin was the principal portion of the marketing margin for the canned and frozen items, while the retailing-wholesaling margin was the largest component for fresh beans. Transportation for the frozen product was about half that for the fresh product, while transportation for the canned product was slightly more than one-fourth that for the fresh product.

Although transportation charges were lower for processed products, and there was no charge for secondary handlers, no large offsetting cost factors were gained by processing snap beans. According to the case-study data presented in this report, processing of snap beans is a cost-increasing type of marketing service. However, it

should be remembered that consumers get something worthwhile for this service: (1) Year-round uniform availability, (2) more stability of price, and (3) convenience in use.

Grower Return

The grower's gross return for snap beans going into processed products averaged about 18 percent of the retail price. This was equivalent to \$1.69 per bushel for those going to freezers and \$1.44 per bushel for those going to canners. In contrast, the case studies of fresh snap beans traced through the marketing system indicate a return of approximately \$2.42 per bushel or about 39 percent of the consumer's dollar. The cost of harvesting is one of the growers largest expenses.

Case study figures should be used with caution since prices of fresh market snap beans are highly volatile. They fluctuate readily as supply conditions change from one production area to another and from one variety to another within an area.

Comparisons of returns for fresh and processed snap beans are difficult since they are based on different production periods. The fresh beans were harvested during the period studied--July 1959 through June 1960. The average farm price for fresh snap beans averaged \$3.19 per bushel during this period. The returns for beans marketed in processed form during this time were based on prices that prevailed during the 1958 and 1959 packing seasons. The average farm price for snap beans for processing was \$1.50 per bushel in 1959 and \$1.55 in 1958. These figures correspond quite well with the grower's returns shown for the processed products in table 5, but not with those for the fresh product.

Some of the difference in returns between fresh and processed forms arises from location differences. Snap beans used by processors are grown primarily in commercial areas expressly for processing. Snap beans for the fresh market are supplied from many sources, including truck garden areas and winter production areas. Yields during the 1950's averaged more than 1,000 pounds per acre greater for beans for processing than for beans for the fresh market.

Oranges and Orange Products

Slightly more than three-fifths of the oranges produced in this country were processed either by canning or freezing in 1958. The proportion of oranges processed has increased steadily since the 1930's. The shift toward processing was greatly accelerated by the wide acceptance of frozen orange concentrate in the late 1940's and thereafter. An 11 percent increase in production was accompanied by a 45 percent increase in farm value of the oranges produced during the 1950's. The number of oranges marketed fresh decreased 17 percent during this period, while those going into processing increased 41 percent. Based on these data, it is evident that processing has been the factor that contributed most to the increase in farm value toward the end of 1950's.

To demonstrate variations in retail prices, marketing margins, and grower's returns, data from case studies are presented for fresh oranges from California and Florida, Florida canned single-strength orange juice, and Florida frozen orange concentrate (fig. 3). These data are for the equivalent of 24 fluid ounces of orange juice, so direct comparisons may be made between forms.

FRESH AND PROCESSED ORANGES

Retail Price, Marketing Margin, and Grower's Returns

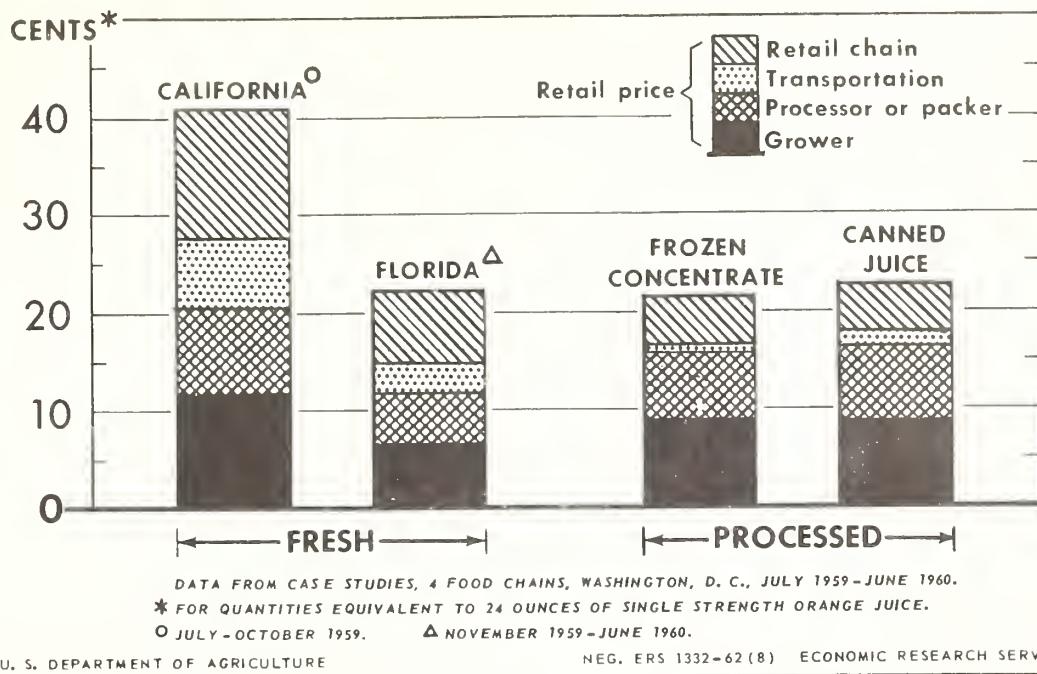


Figure 3

Retail Prices

During the 12-month period studied the retail price was lower for orange juice from frozen orange concentrate than that from other forms (table 7). It averaged 21.3 cents for a quantity equivalent to 24 ounces of orange juice. A comparable quantity of canned orange juice was only slightly higher at 22.5 cents. The retail price for an equivalent quantity of juice from California fresh oranges averaged 40.9 cents during the first 4 months of the study, compared with an average of 22.0 cents for fresh oranges from Florida. The price comparison for fresh oranges was less meaningful because California Valencia oranges predominated in the stores in the first 4 months of the study and Florida juice oranges were available during the remaining 8 months in the study.

Month-to-month price variations were much greater for fresh oranges than for either of the processed products (table 8). Price variation between months, disregarding direction, averaged about the same for both processed products, 1.4 cents; while the average monthly variation for fresh oranges was 2.2 cents for Florida oranges and 3.6 cents for California oranges.

Chain Margin

The chain store margin was less for canned orange juice than for any other form included in the study. It averaged 4.7 cents for 24 fluid ounces of orange juice and

Table 7.-Oranges: Retail price, marketing margins, and grower's return for selected lots of fresh, canned juice, and frozen concentrate, quantities equivalent to 24 ounces of single-strength orange juice sold in four chain stores, Washington, D. C., July 1959 - June 1960 1/

Item	Fresh oranges			Canned orange juice		
	California 2/		Florida 3/	Frozen orange concentrate		Canned orange juice
	Cents	Percent	Cents	Percent	Cents	Percent
Retail price 5/.....	40.9	100.0	22.0	100.0	21.3	100.0
Marketing margin --						
Chain margin 6/.....	13.3	32.5	7.2	32.7	4.8	22.5
Transportation.....	7.1	17.4	3.0	13.7	.9	4.2
Packer or processor.	8.8	21.5	5.2	23.6	6.7	31.5
Total.....	29.2	71.4	15.4	70.0	12.4	58.2
Grower's return.....	11.7	28.6	6.6	30.0	8.9	41.8

1/ Based on case studies.

2/ July - October 1959.

3/ November 1959 - June 1960.

4/ Percentage of retail price.

5/ Retail price for fresh oranges includes an allowance of 5 percent for waste and spoilage.

6/ Chain margin includes margin for few lots of each form (except fresh Florida oranges) traced through intermediate handlers.

Table 8.--Oranges: Retail price and margins for selected lots of fresh, frozen concentrate, and canned juice, quantity equivalent to 24 ounces of orange juice, four chain stores, Washington, D. C., by months, July 1959 - June 1960

Month and year	Processed oranges						Fresh oranges <u>1/</u>					
	Frozen concentrate			Canned juice			California			Florida		
	Retail price	Retail margin	Retail price	Retail margin	Retail price	Retail margin	Retail price	Retail margin	Retail price	Retail margin	Retail price	Retail margin
1959												
July.....	24.9	5.7	29.6	24.9	3.4	13.7	40.6	11.5	28.3	2.7	---	---
August.....	24.9	5.5	22.1	24.8	3.7	14.9	36.7	8.6	23.4	2.7	---	---
September.....	22.4	3.8	17.0	24.5	3.9	15.9	39.9	12.3	30.8	2.7	---	---
October.....	25.5	5.4	21.2	25.0	4.0	16.0	46.4	15.9	34.3	2.7	---	---
November.....	24.7	5.1	20.6	25.0	4.3	17.2	2.7	---	24.7	10.5	42.5	42.5
December.....	24.7	5.7	23.1	18.5	3.2	17.3	2.7	---	19.9	6.8	34.2	34.2
1960												
January.....	17.9	3.0	16.8	21.9	3.9	17.8	2.7	---	19.8	5.2	26.3	26.3
February.....	19.1	4.4	23.0	21.7	7.2	33.2	2.7	---	21.9	6.2	28.3	28.3
March.....	18.0	3.8	21.1	19.9	3.7	18.6	2.7	---	19.2	5.1	26.6	26.6
April.....	17.7	3.7	20.9	19.3	4.1	21.2	2.7	---	22.2	6.9	31.1	31.1
May.....	18.4	3.9	21.2	20.8	5.7	27.4	2.7	---	22.2	8.1	36.5	36.5
June.....	17.7	3.8	21.5	19.5	3.6	18.5	2.7	---	26.4	9.1	34.5	34.5
Average.....	21.3	4.5	21.5	22.5	4.2	18.7	40.9	12.1	29.6	22.0	7.2	32.7

1/ Retail price for fresh oranges includes an allowance of 5 percent for waste and spoilage.

2/ Not available or insufficient data to report.

represented 20.9 percent of the consumer's dollar. The margin for frozen orange concentrate was slightly higher at 4.8 cents, or 22.5 percent of the consumer's dollar. The margins for an equivalent quantity of juice from fresh oranges was much higher, averaging 7.2 cents for Florida oranges and 13.3 cents for California oranges.^{7/} The chain margin accounted for about one-third of the consumer's dollar spent for fresh oranges from both sources.

The average monthly variation in the retail margins for the processed products and for fresh oranges from California and Florida was smallest for frozen concentrate and was greatest for California oranges (table 7).

Transportation

The transportation charges for oranges varied by type of product and distance from the shipping point to market. There is considerable saving in transporting concentrated orange juice compared to transporting either the canned product or fresh oranges (table 7). It cost less than 1.0 cent to transport frozen orange concentrate from Florida to Washington, D. C., compared with 1.6 cents for an equivalent quantity of canned single-strength juice and 3.0 cents for fresh oranges. The transportation charge was 7.1 cents for fresh oranges from California. Percentagewise the charge for transportation ranged from 4.2 percent for the frozen concentrate from Florida to as much as 17.4 percent of the consumer's dollar for fresh oranges from California.

The savings in transportation charges made possible by the reduced weight and volume associated with the frozen concentrate has been a key factor in developing the market for the frozen product.

Packer or Processor Margins

The packer's margin for California oranges averaged 8.8 cents for a quantity of oranges equivalent to 24 ounces of single-strength orange juice during the 4 months included in the study (table 7). Fresh oranges from Florida had a lower packer's margin, averaging 5.2 cents during the 8 months studied. The processor's margin was 6.7 cents for frozen concentrate and 7.5 cents for canned single-strength juice. The processor's margin for the two processed products ranged from 31 to 33 percent of the consumer's dollar while the packer's margin for fresh oranges from California and Florida ranged from 22 to 24 percent (table 7).

Marketing Margins

The total marketing margin was less for the processed products than for fresh oranges from either California or Florida. The marketing margins averaged 12.4 cents for frozen concentrate and 13.8 cents for canned juice, or about 60 percent of the consumer's dollar for both processed items. The total spread for marketing Florida fresh oranges was 15.4 cents and 29.4 cents for California oranges, averaging about 70 percent of the consumer's dollar from both sources.

The margin taken by the processor was the largest component of the marketing margin for processed products. However, the largest component of the marketing

^{7/} Based on 4 months, July 1959 through October 1959, for California oranges and on 8 months, November 1959 through June 1960, for Florida oranges.

margin for fresh oranges was the retail margin, which accounted for about half of the total.

Transportation was the smallest component of the marketing margin for each item studied. However, its relative importance varied considerably among the items, ranging from about 7 percent of the total marketing spread for frozen concentrate to 20 percent for fresh oranges from Florida, and 24 percent for fresh oranges from California.

These data demonstrate that products created by additional processing and having higher processing margins, can have offsetting savings that benefit both the grower and the consumer. The grower is benefited by receiving higher returns for his oranges, and the consumer is benefited by paying lower retail prices for orange juice. This is possible because of lower transportation charges for the processed products, particularly the frozen orange concentrate, and because of lower retail margins due to reduced perishability and increased standardization in the processed product. In addition, economies of scale were made possible by the increased volume marketed.

Grower's Returns

The grower's gross return was greater for frozen orange concentrate and canned orange juice than for Florida oranges sold on the fresh market (table 7). The return averaged 8.8 cents for 24 fluid ounces of juice for both the frozen and the canned product and represented about 40 percent of the consumer's dollar, compared with 6.6 cents and 30 percent for fresh oranges from Florida. The grower's return as a percentage of retail price was lowest for California fresh oranges. However, because of the higher retail price for California oranges, the dollar return to growers was higher for the California fresh oranges than for any of the other forms included in the study.

The difference in grower's returns from Florida oranges for processing and those for the fresh market was primarily due to differences in price levels between seasons. Most of the processed orange products in this study were processed during the 1958-59 season, while all of the Florida fresh oranges in the study were from the 1959-60 season. The following tabulation shows the season average on-tree price per box for Florida oranges for processing and for fresh market for 1958-59 and 1959-60 seasons:

<u>Season</u>	<u>Fresh</u>	<u>Processed</u>
1958-59	\$2.78	\$2.91
1959-60	2.02	1.94

The price level was much higher when most of the oranges were produced for processing than when most oranges were produced for the fresh market. Therefore, the difference in grower's returns between oranges for processing and those for fresh market was due to different price levels between years rather than to the increasing importance of processing.

Lemons and Lemon Products

The farm value for lemons reached an all time high of \$49 million in 1952. From 1952 to 1959 production of lemons in this country increased 45 percent. However, this rapid increase in production was accompanied by a drastic reduction in farm value to

slightly less than \$35 million in 1959. This was a drop of 28 percent in the 7-year period. The average return to growers dropped from \$3.90 per box to \$1.92.

The quantity of lemons marketed in fresh form remained about the same during this period with only a slight upward trend. However, lemons going into processed products more than doubled, increasing from 4.3 million boxes in 1952 to 8.8 million boxes in 1959. The share of the total production being processed increased from 34 percent to 49 percent.

This report presents marketing margins and grower returns for case studies of three of the forms in which a consumer may purchase lemons and lemon products. The items are fresh lemons, bottled or canned single-strength lemon juice, and frozen lemonade concentrate (fig. 4).

The data for frozen lemonade concentrate and lemon juice are for quantities equivalent to the volume of lemon juice obtained from a 39.5 pound carton of fresh lemons.^{8/} This enables a direct comparison of prices, margins, and charges for processed products with those for fresh lemons.

Retail Prices

The prices paid by consumers for lemons and lemon products varied according to the form in which they were sold. Retail prices were higher for fresh lemons than for either of the processed items included in this study. A carton of fresh lemons cost consumers an average of \$7.01 during the 12 months studied, compared with \$6.03 for an equivalent quantity of frozen lemonade concentrate. The retail price for canned or bottled single-strength lemon juice was lowest, averaging \$3.99 for an equivalent quantity (table 9).

The month-to-month variation in the retail price was much greater for fresh lemons than for either of the processed products (table 10). The average price change from one month to the next, disregarding direction of change, was 45 cents for fresh lemons compared with 15 cents for an equivalent quantity of lemonade and 6 cents for an equivalent quantity of lemon juice.

Chain Margins

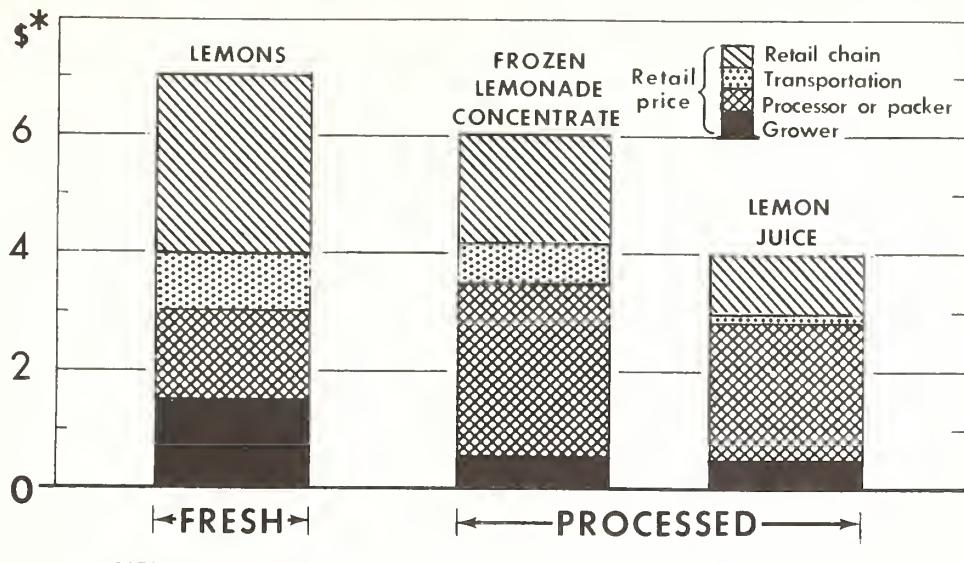
The chain store margin was much greater for fresh lemons than for the processed items. The chain margin for fresh lemons averaged \$3.06 compared with \$1.84 for lemonade and \$1.01 for lemon juice.

The margins for the processed items were more stable over the 12-month period than those for fresh lemons (table 10). However, for each of the processed products the margin was not as stable as the month-to-month variation recorded for the retail price. This indicates that changes in the price paid by the retailers may not be reflected immediately in their selling prices.

^{8/} Hereafter in this section of the report the term cartons will refer to a 39.5 pound carton of lemons at the grower's level. A carton of fresh lemons at the retail level is considered to weigh 37.5 pounds after allowing 2 pounds for waste and spoilage.

FRESH AND PROCESSED LEMONS

Retail Price, Marketing Margin, and Grower's Returns



DATA FROM CASE STUDIES, 4 FOOD CHAINS, WASHINGTON, D. C., JULY 1959 - JUNE 1960.
*FOR QUANTITIES EQUIVALENT TO 39.5 POUND CARTON OF FRESH LEMONS.

U. S. DEPARTMENT OF AGRICULTURE

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Figure 4

Table 9.--Lemons: Retail price, marketing margin, and grower's return for selected lots of fresh lemons and lemon products in quantities equivalent to the juice from 39.5 pound carton of lemons, four chain stores, Washington, D. C., July 1959 - June 1960 ^{1/}

Item	Fresh lemons		Lemon juice ^{2/}		Lemonade ^{3/}	
	Dollars	Percent	Dollars	Percent	Dollars	Percent
	^{4/}		^{4/}		^{4/}	
Retail price ^{5/}:	7.01	100.0	3.99	100.0	6.03	100.0
Marketing margin --:						
Chain margin.....:	<u>6/</u> 3.06	43.6	1.01	25.3	1.84	30.5
Transportation....:	.91	13.0	.15	3.8	.68	11.3
Packer-processor..:	1.59	22.7	2.31	57.9	2.96	49.1
	:	:	:	:	:	:
Total.....:	5.56	79.3	3.47	87.0	5.48	90.9
	:	:	:	:	:	:
Grower's return....:	1.45	20.7	.52	13.0	.55	9.1

^{1/} Based on case studies.

^{2/} Canned or bottled single-strength lemon juice.

^{3/} Frozen lemonade concentrate.

^{4/} Percentage of retail price.

^{5/} Retail price for fresh lemons includes a 5 percent allowance for waste and spoilage.

^{6/} Chain margin also includes average wholesale margin of 18 cents per carton.

Table 10.-Lemons: Retail price and chain margin, for fresh, canned or bottled lemon juice, and frozen lemonade concentrate in quantities equivalent to the juice from lemons in a 39.5 pound carton, four chain stores in Washington, D. C., by months, July 1959 - June 1960

Months	Fresh lemons			Lemon juice 1/			Lemonade 2/		
	Retail price	Retail margin	Retail price	Retail margin	Retail price	Retail margin	Retail price	Retail margin	Retail price
	'3/	: Actual ; of retail price	: Actual ; of retail price	: Percentage of retail price	: Actual ; of retail price	: Percentage of retail price	: Actual ; of retail price	: Percentage of retail price	: Actual ; of retail price
	Dol.	Dol.	Pct.	Dol.	Dol.	Pct.	Dol.	Dol.	Pct.
<u>1959</u>									
July.....	6.27	2.10	33.5	3.99	.99	24.7	5.92	1.52	25.7
August....	5.99	2.05	34.2	4.03	1.06	26.3	5.84	1.72	29.5
September....	7.41	2.53	34.1	3.95	.96	24.3	5.46	1.13	20.7
October....	7.64	3.02	39.5	3.86	.83	21.5	5.63	1.05	18.7
November....	7.47	2.85	38.2	3.86	.84	21.8	6.13	1.76	28.7
December....	7.12	2.80	39.3	3.86	.83	21.5	6.13	1.78	29.0
<u>1960</u>									
January....	7.12	3.16	44.4	3.86	.83	21.5	6.00	1.65	27.5
February....	7.54	3.76	49.9	3.95	.96	24.3	6.30	1.96	31.1
March....	6.35	2.77	43.6	4.16	1.11	26.7	6.30	1.83	29.0
April....	6.62	2.78	42.0	4.16	1.14	27.4	6.30	1.95	31.0
May....	7.38	3.47	47.0	4.16	1.16	27.9	6.30	2.32	36.8
June....	7.18	3.22	44.8	3.99	.97	24.3	6.08	2.12	34.9
12-month average..	7.01	2.88	41.1	3.99	.97	24.3	6.03	1.73	28.7

1/ Canned or bottled single-strength lemon juice. Monthly prices give equal weight to price for pint bottles and 6 and 5 3/4 fluid ounce cans.

2/ Frozen lemonade concentrate.

3/ Retail price for fresh lemons includes a 5 percent allowance for waste and spoilage.

Intermediate Handler's Margin

Intermediate handlers were seldom used for the lots of processed products traced back to the processors. They were used for only 3 of the 10 lots of fresh lemons that were traced to shipping point. Because of the small number of cases, data for intermediate handlers are not shown separately but are included in the chain margin.

Transportation

The transportation charges were considerably lower for single-strength lemon juice than for either frozen lemonade or fresh lemons. The charge averaged only 15 cents for the lemon juice compared with 68 cents for lemonade concentrate and 91 cents for fresh lemons.

This relatively small transportation charge for lemon juice is the result of an unique marketing technique. Processors in California process fresh lemon juice into a 6.1 concentrate. This concentrate is shipped to canning or bottling plants in the East to be reconstituted into single-strength juice and put into retail containers. The rail rate on the concentrate for juice equivalent to that from a carton of fresh lemons is only 5 cents. The charge for transporting the finished product from the reconstituting plant in the East to the four chains in this study average about 10 cents.

Processor or Packer Margins

The processor's margin was the largest component of the marketing spread for both of the processed products. It averaged \$2.96 for frozen lemonade concentrate and \$2.31 for canned and bottled single-strength lemon juice. These margins compare with a packer's margin of \$1.59 for fresh lemons.

The services performed by the packers and processors are different for all three forms included in the study. The principal elements they have in common is that they perform their services at the same level in the marketing system and they prepare the product for the market.

The packer's spread covered such services as grading, sizing, and packaging for shipment to market. The processor performed the same services for both products until the fresh lemon juice was concentrated. The processor of lemonade concentrate combined lemon juice concentrate, sugar, and other ingredients to make lemonade concentrate. Generally, canning and freezing was done at or near the point of production. For the single-strength lemon juice included in this study, an additional group of processors were involved. These processors reconstituted the concentrated product into single-strength lemon juice in plants located near consumption areas in the East. They also put the product in retail containers for distribution to retail outlets.

Marketing Margins

The total marketing margin was greater for lemons marketed fresh than for those marketed in processed form. The total margin for marketing fresh lemons was \$5.56 per carton, which was 79 percent of their retail price. In contrast, the spread between the grower and the consumer for single-strength lemon juice was \$3.47 for a quantity equivalent to the juice from a carton of fresh lemons. This amounted to 87 percent of the retail price.

The retail margin was the largest component of the marketing margin for fresh lemons. It represented about 55 percent of the total margin. For the processed products the retail margin accounted for about one-third of the total margins. The processor's margin was by far the largest component of the margin for the processed products.

These data show that for the cases in this study the higher processing margin for the processed lemon products was more than offset by lower transportation charges and lower retail margins compared with fresh lemons. So if the grower returns are raised to the same level as those he receives for fresh lemons, retail prices still would be lower for processed products than for fresh lemons.

It appears that the retail margin varies according to the degree of perishability associated with the product. The margin is highest for fresh lemons which have a limited shelf life. Next largest is the margin for lemonade, a semiperishable product, which must be stored and displayed in low temperature cabinets. The lowest margin is for single-strength lemon juice, which may be treated as a grocery item and does not require special handling.

Grower's Returns

The grower's gross return was greater for lemons marketed in fresh form than for those going into processed products. The return to growers averaged about \$1.45 per carton of fresh lemons, while the returns for equivalent quantities of lemons marketed in processed products averaged 52 cents for single-strength lemon juice and 55 cents for frozen lemonade concentrate.

Marketing organizations regulate to some extent the volume of lemons marketed fresh to maintain net returns above those received from lemons marketed in processed form. This means that a large volume of lemons must be diverted to processing. Increased supplies and competition from imports of lemon juice have lead to depressed returns from lemons used for processing. Each grower receives an equitable share of returns from lemons sold on the fresh market and from those going into processed products. His average returns from all his lemons is less than that attributed to fresh lemons and more than that from lemons for processing.

CONCLUSION

Marketing Costs

Processing added to the cost of marketing each of the four case study products -- potatoes, snap beans, oranges, and lemons. The net addition to total marketing costs per unit depended on the extent to which this increase was offset by decreases at other levels of the marketing system. Charges for intercity transportation of equivalent quantities of fresh and processed products were less for the processed products. Compared to retail food chain margins for corresponding fresh products, those for processed potatoes and snap beans were higher and those for processed oranges and lemons were lower. Total unit marketing charges were higher for processed potatoes and snap beans than for the fresh products. But it cost less to market oranges and lemons in processed than in fresh form.

For commodities in which processing is important, efficiency due to innovations and structural changes, at both the marketing level and the farm level are developing to a point where only large volume operators can be competitive. Efficient operators obtain a temporary cost advantage until other operators reach the same degree of efficiency. Then they must seek new improvements to stay ahead. Efficiency, like innovation, is a never ending process---at either the farm level or the processor-manufacturer level.

Increased competition resulting from improving efficiency has caused food manufacturers to emphasize diversification and the development of new products. Firms in a highly competitive market diversify to spread risk and to develop other sources of profit. Many firms turn to product development as a method of diversification. If a firm is able to develop an acceptable new product and market it before others in the field it may benefit from shortrun monopoly profits, even though development costs are high. Its success depends upon how soon competitors offer a comparable product and the cost of development and promotion for the new product. Many consumers are apparently willing to try new products. Although a product has been accepted it may soon be rejected when the venturesome consumer is ready to try other new products. In turn, the firm's monopoly profits diminish unless it has additional new products to offer the consumer. This may help the trend toward more processed food products.

Processing allows for differentiation of agricultural products to a much greater extent than is possible with fresh products. Differentiation through advertising and promotional techniques increases total marketing costs. However, if through advertising and promotion the demand for a commodity is increased, then economies may develop that will reduce the per-unit cost of distribution, including the cost of promotion.

Highly processed products are generally more standardized and not as perishable as their fresh and less processed counterparts, lending themselves to lower cost handling methods in wholesaling. Losses due to waste and spoilage are minimized.

Case studies in this report show transportation charges were lower for equivalent quantities of the processed products than for fresh products. For example, transportation charges for dehydrated potatoes from Idaho to Washington, D. C. were only 22 cents for a quantity equivalent to 100 pounds of fresh potatoes. The transportation charge for 100 pounds fresh potatoes was \$1.86 from Idaho, 87 cents from Maine, and 48 cents from New York State.

Returns to farmers per unit of product were less for raw products to be processed than for those sold fresh for case study commodities. Net return per unit of production (per acre) depends on the difference between total revenue and total cost.

Processing of foods tends to reduce transportation charges per unit of product. Therefore, the impact of increased processing may reduce the total transportation bill for a given commodity. Fewer transportation facilities are required to market processed products than to market equivalent quantities of fresh commodities due to reduced weight and bulk. Demands for transportation facilities are also less seasonal for processed products.

Farmer's Returns

Technological change in marketing has affected returns to farmers in many ways. This report has only touched on a few of the more important ones. The impact varies

by commodity, by region, by supply and demand conditions, by seasons, and by many other factors both local, national and international in scope. For this reason generalization as to the impact of specific marketing services on returns to farmers is hazardous. However, we can point out some of the advantages and disadvantages that may accrue to farmers marketing their products through food processors or manufacturers. Again, it must be recognized that advantages to one group of farmers may be a decided disadvantage to another group.

Advantage to farmers--

(a) Processing provides an outlet for many products that would otherwise have no profitable outlet. It provides for the utilization of many of the lower grades of some commodities that cannot be marketed in fresh form.

(b) Contract agreements between the grower and the processor tend to stabilize prices and reduce risk for the farmer. But the extent of this advantage to the farmer depends on the proportion of the crop being processed and the level at which the contract price is established.

(c) If the demand for a commodity is increased by the addition of marketing services through processing, then it is possible for the farmer to benefit by receiving higher returns per unit for the raw product, provided the supply does not increase as fast as the demand. Frozen orange concentrate is an example of this.

Disadvantages to farmers--

(a) The fact that processors are becoming fewer and larger coupled with the trend toward more processed products means that farmers will have to bargain with fewer but larger firms for a larger share of their production. This could weaken their bargaining position unless they organize into strong selling organizations or unless they have alternative production enterprises.

(b) The addition of marketing services by processing reduces the farmer's share of the consumer's dollar. While this may not directly affect farmer's returns per unit, it may cause farm prices to be less responsive to changes in retail prices. The danger in this is that changes in consumer demand will not be directly reflected in the farm price.

(c) For many commodities it will become increasingly difficult for small farmers to compete with large farmers for sale of raw products to processors. Processors need large supplies of raw product; therefore, they may tend to favor the large producer. The same can be said for the fresh market -- large chains need large quantities of uniform products, therefore they tend to buy from larger producers.

(d) Processors tend to draw more of their raw products from highly specialized, low-cost production areas. As demand for processed products increases, the demand for fresh market products usually will be weakened. Producers for fresh market must seek alternative enterprises to maintain their income. Sometimes this is not possible; therefore, farmers in these areas often suffer depressed incomes. The efficient producers in the specialized area will benefit most from the shifts to processed products. However, in some specialized areas, the introduction of processing has strengthened the demand for both fresh and processed products. Idaho potatoes are an example of this.

The case studies cited in this report demonstrate the wide variation in unit returns between processed and fresh forms of the four commodities studied. Each of the commodities are discussed separately.

Snap beans are an example of a commodity that has experienced a shift in production away from fresh market areas to specialized production areas. Although returns per unit were less for beans for processing, average yields per acre were about 1,000 pounds greater than yields of beans for fresh market. Therefore, unit production costs may have been less for beans to be processed than those for the fresh market. However, net returns cannot be determined because of lack of data on cost of production in the various producing areas.

Florida oranges offer an example in which the demand for the processed product increased at a faster rate than the supply of oranges. Under these circumstances, increased processing has contributed to higher prices and greater returns for growers.

Lemons provide an example of a commodity in which the quantity marketed fresh is controlled, thereby controlling the returns to growers for those sold fresh. The remainder of the production is diverted to processing. Because of increased supplies of processed lemon products including imported juice during recent years, grower's returns have decreased.

Potatoes.--The share of potatoes used for food going into new products promises to become much greater in the future. Many processed potato products utilize potatoes of sizes or shapes unacceptable for fresh market. This has provided growers with a return for lower grade potatoes which are not salable on the fresh market. As the demand for processed products becomes greater, a larger share of total production will be diverted to processing. Therefore, the quality of potatoes going into processed products will also increase as the share becomes greater.

According to a recent USDA report, the introduction of processed potato products seems to have halted the decline in per capita consumption of potatoes.^{9/} If this indicates an increased demand for potatoes returns to growers may also increase, provided overproduction does not occur. Most of the processors of new potato products (particularly dehydrated mashed and frozen french fries) draw their supplies from late crop States. Increased demand for these products will mean that a larger share of late crop potatoes will go into processing. If consumers substitute these potato products for early potatoes, growers in the early and intermediate States, who do not have processing facilities for these products because of a short season, will suffer because of weakened demand for their potatoes.

^{9/} Harp, Harry H. and Dunham, Denis F. Market Potential for Processed Potato Products. U. S. Dept. Agr., Econ. Res. Serv., Mktg. Res. Rpt. No. 505, 1961.

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